

# PATENT ABSTRACTS OF JAPAN

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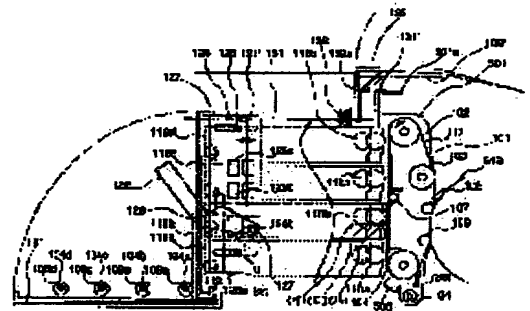
(72)Inventor : KIKUCHI KAZUO  
SAITO MASAHIKO  
HAYANO TOMIO

## (54) ELECTROPHOTOGRAPHIC DEVICE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To easily attach and detach a photoreceptor without damaging it by providing an attachment and detachment arresting means and an interlocking means capable of releasing the attachment and detachment arresting state, and allowing the attaching and detaching operation of the photoreceptor when a developing unit is retreated to a position never obstructing the attaching and detaching movement of the photoreceptor.

**SOLUTION:** Each developing unit 116a-116d is movable along a guide member, and can be horizontally moved and attached or detached by opening a developing unit attaching and detaching door 111. Each developing unit 116a-116d is moved to a waiting position by operating a level 122, and an interlocking bar 131 is also moved to a waiting position to ensure a sufficient distance with a photosensitive belt 117. Thus, the developing unit attaching and detaching door 111 is opened around a fulcrum 112 to allow the attachment and detachment of each developing unit 116a-116d. Accordingly, the damage of a photoreceptor in attachment and detachment is prevented, and a satisfactory operation can be surely performed.



## LEGAL STATUS

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] The electrophotography equipment which carries out [ having established the attachment-and-detachment inhibition means which changes attachment-and-detachment actuation of said photo conductor into an inhibition condition, and the interlocking means whose discharge of the attachment-and-detachment inhibition condition by said attachment-and-detachment inhibition means is enabled when moving said development counter to a retreat location in the electrophotography equipment equipped with the development counter which can move toward the removable photo conductor and said photo conductor, and ] as the description.

[Claim 2] In a removable photo conductor, the photo conductor attachment-and-detachment door which permits attachment-and-detachment actuation of this photo conductor, and the electrophotography equipment equipped with the development counter which can move toward said photo conductor Electrophotography equipment carried out [ having established the attachment-and-detachment inhibition means which changes attachment-and-detachment actuation of said photo conductor into an inhibition condition, and a interlocking means to open slightly said photo conductor attachment-and-detachment door while enabling discharge of the attachment-and-detachment inhibition condition by said attachment-and-detachment inhibition means, when moving said development counter to a retreat location, and ] as the description.

[Claim 3] In the electrophotography equipment equipped with the development counter which can move, and the development counter attachment-and-detachment door which enables attachment-and-detachment actuation of said development counter by opening toward a removable photo conductor and this photo conductor Electrophotography equipment carry out having prepared the attachment-and-detachment inhibition means which changes attachment-and-detachment actuation of said photo conductor into an inhibition condition, and the interlocking means whose discharge of the attachment-and-detachment inhibition condition by said attachment-and-detachment inhibition means is enabled while disconnection of said development counter attachment-and-detachment door is interlocked with and moving said development counter to a retreat location as the description.

[Claim 4] In the electrophotography equipment equipped with the development counter which can move, and the development counter attachment-and-detachment door which enables attachment-and-detachment actuation of said development counter by opening toward the removable photo conductor, the photo conductor attachment-and-detachment door which permits attachment-and-detachment actuation of this photo conductor, and said photo conductor While the attachment-and-detachment inhibition means which changes attachment-and-detachment actuation of said photo conductor into an inhibition condition, and disconnection of said development counter attachment-and-detachment door are interlocked with and moving said development counter to a retreat location, discharge of the attachment-and-detachment inhibition condition by said attachment-and-detachment inhibition means is enabled. Furthermore, electrophotography equipment characterized by establishing a interlocking means to open slightly said photo conductor attachment-and-detachment door.

[Claim 5] A removable photo conductor and the photo conductor attachment-and-detachment door which permits attachment-and-detachment actuation of this photo conductor, The development counter which moves to the 2nd location which separates from the 1st location which is prepared possible [ an attitude ] toward said photo conductor, acts on said photo conductor, and performs a development operation, and said photo conductor, and suspends a development operation, In electrophotography equipment equipped with the development counter attachment-and-detachment door which enables attachment-and-detachment actuation of said development counter by opening The attachment-and-detachment inhibition means which

changes attachment-and-detachment actuation of said photo conductor into an inhibition condition, and an actuation means for it to be prepared in said development counter attachment-and-detachment door, and to move said development counter to said 1st or 2nd location, Electrophotography equipment characterized by to establish the migration means to which said development counter is evacuated to the 3rd location acting as the failure of photo conductor attachment-and-detachment migration, and the interlocking means whose discharge of the inhibition condition by said attachment-and-detachment inhibition means is enabled after said migration means was interlocked with and the development counter has retreated in the 3rd location.

[Claim 6] Said migration means is electrophotography equipment characterized by making actuation possible when a development counter attachment-and-detachment door is wide opened in claim 5.

[Claim 7] It is electrophotography equipment characterized by making it said migration means interlocked with disconnection of a development counter attachment-and-detachment door in claim 5.

[Claim 8] It is electrophotography equipment characterized by preparing in the interior material of a maintenance proposal to which it shows attachment-and-detachment migration while said attachment-and-detachment inhibition means holds said photo conductor in the 1st term of claims 1-5.

[Claim 9] The electrophotography equipment carry out having prepared a removable sensitization belt unit, the attachment-and-detachment inhibition means which change attachment-and-detachment actuation of said sensitization belt unit into an inhibition condition in the electrophotography equipment equipped with the development counter which can move toward said sensitization belt unit, and the interlocking means whose discharge of the attachment-and-detachment inhibition condition by said attachment-and-detachment inhibition means enables when moving said development counter to a retreat location as the description.

[Claim 10] The electrophotography equipment carry out having prepared a removable sensitization belt unit, the attachment-and-detachment inhibition means which change attachment-and-detachment actuation of said sensitization belt unit into an inhibition condition in the electrophotography equipment equipped with two or more development counters which can move toward said sensitization belt unit, and the interlocking means whose discharge of the attachment-and-detachment inhibition condition by said attachment-and-detachment inhibition means enables when moving all said development counters to a retreat location as the description.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the color copying machine and electrophotography equipment like a color printer which form a color toner image by imprinting in piles the toner image which developed and acquired the latent image for every primary color formed in the photo conductor with the development counter to a middle transfer medium.

[0002]

[Description of the Prior Art] The color copying machine of an electrophotography method and many of color printers are developed with the development counter which chose the latent image formed on the photo conductor for every color, and they form toner \*\*\*\* for every color, they are imprinted so that the toner image of each color may be piled up one by one on a middle transfer medium, and they are constituted so that a color image may be formed. It is usually necessary to detach and attach a developer for supply of the toner used for exchange or development etc. Moreover, it is required to also exchange photo conductors repeatedly generally, by the time the life of the body of equipment is exhausted, and it needs too removable structure. In said developer, the part (generally developing roller) which performs a development operation approaches or contacts a photo conductor in the state of actuation (development), and is moved to the location which secures predetermined spacing in the halt (un-developing negatives) condition. Moreover, a photo conductor and a middle imprint object are structures which are contacted by the part and imprint a toner image.

[0003] As for the migration between the operating states and idle states of a developer, it is common to carry out by making a certain guide means meet, and it is advantageous to carry out in the migration direction in which attachment and detachment of this developer also met this guide means.

[0004] On the other hand, with such equipment, in detaching and attaching a photo conductor, the structure of securing a distance required among these is needed so that the developer or middle imprint object in the condition of having contacted or approached may not receive an abrasion. One solution is structure constituted so that a photo conductor may be detached and attached by Kami who secured distance with a photo conductor for the developer as a idle state certainly, and such an example is indicated by JP,5-66660,A etc.

[0005]

[Problem(s) to be Solved by the Invention] Generally, the life of a middle imprint object is longer than a photo conductor, and becomes that it is more advantageous to have enabled it to detach and attach separately in respect of maintenance nature and a running cost. In this case, the structure to which a photo conductor can be moved so that neither a developer nor a middle imprint object may be contacted is required in the case of attachment and detachment. Furthermore, structure where special not a service engineer but general user enable it to carry out exchange of each part including a photo conductor themselves recently is desired, and it is much more important that it is made to do an activity simple and easy.

[0006] The purpose of this invention is to enable it to detach and attach easily, without damaging a photo conductor.

[0007]

[Means for Solving the Problem] In the electrophotography equipment equipped with the development counter which can move toward the photo conductor with removable this invention, and said photo conductor The attachment-and-detachment inhibition means which changes attachment-and-detachment actuation of said photo conductor into an inhibition condition, and the interlocking means whose discharge of the attachment-and-detachment inhibition condition by said attachment-and-detachment inhibition means

is enabled when moving said development counter to a retreat location are established. When it retreats to a location with the development counter acting as [ in a location ] the failure of attachment-and-detachment migration of a photo conductor, attachment-and-detachment actuation of a photo conductor is enabled.

[0008]

[Embodiment of the Invention] Hereafter, 1 operation gestalt of this invention is explained with reference to a drawing.

[0009] Drawing 5 is a vertical section side elevation of a color electro photographic printer which becomes this invention. The outside surface of the sensitization belt 117 which is stretched in a cartridge case 501 and rotates is uniformly charged with the electrification vessel 506, the scan optical system 507 is exposed, and the electrostatic latent image for every color is formed. Four development counters 116a-116d which are developers develop the electrostatic latent image of each color of the outside surface of the sensitization belt 117 with the toner of the \*\*\*\*ing color, and form the toner image of each color. Development counters 116a-116d are considered as arrangement of the order of black, cyanogen, a Magenta, and yellow from the upper part. And a color toner image is formed in the peripheral face of this middle imprint drum 512 by imprinting each toner image on the sensitization belt 117 in piles to the peripheral face of the middle imprint drum 512.

[0010] Electrification and exposure to the sensitization belt 117, and development are performed for every color, and after cleaning by the cleaning blade (belt cleaner) 523 for every \*\*\*\*\*, it initializes with an eraser (illustration abbreviation).

[0011] a form 514 -- the feed roller 515 -- from the form cassette 516 -- extracting -- sending out -- a resist roller pair -- paper feed is carried out so that it may synchronize with the color toner image on the middle imprint drum 512 by Kami who adjusted the location by 517, and the color toner image on the middle imprint drum 512 is imprinted on the front face of this form 514 by contacting the tooth back of this form 514 in the imprint machine 518 which gave predetermined potential. The electric discharge machine 525 discharges a form 514, and makes easy exfoliation from the middle imprint drum 512.

[0012] a fixing assembly 522 -- a color toner image -- a form 514 -- being established -- a delivery roller pair -- 521 discharges the form [ finishing / fixing ] 514 to tray 519a formed in the top face of the equipment outer frame 519.

[0013] The drum cleaner 524 removes the non-imprinted toner which remains to the middle imprint drum 512, after imprinting a color toner image in a form 514.

[0014] It is made to evacuate from the middle imprint drum 512, and is made for the imprint machine 518 and the drum cleaner 524 not to disturb the color toner image in the middle of formation to the peripheral face of this middle imprint drum 512 other than the time of the color toner image imprint to a form 514.

[0015] In addition, a cartridge case 501 is later mentioned for details, although the electrification machine 506, a belt cleaner 523, etc. are built in out of said sensitization belt 117 and the sensitization belt unit 101 which can be freely detached and attached on the body of equipment is constituted.

[0016] Moreover, by having become movable along with the guide member at the longitudinal direction of drawing, and opening the development counter attachment-and-detachment door 111, it is made to move horizontally and each development counters 116a-116d are removable. Each development counters 116a-116d move alternatively by rotation of Cams 104a-104d between the actuation (development) location which moved forward, and the halt (un-developing negatives) locations which retreated, respectively.

[0017] Drawing 1 , drawing 2 , and drawing 3 show the relative relation between the sensitization belt unit 101 and development counters 116a-116d in this operation gestalt, and the middle imprint drum 512 to the detail. Drawing 1 is a vertical section side elevation in which the vertical section side elevation and drawing 2 show some crossing top views of drawing 1 , and drawing 3 shows the detail of the flank of the sensitization belt unit of drawing 1 .

[0018] The sensitization belt 117 forms and constitutes an organic photo conductor layer on the front face of a resin film, it arranges a driving roller 102, a tension roller 103, the follower roller 104, and the auxiliary roller 105,106,107 inside, gives a proper tension, contains it to a cartridge case 501, and constitutes the exchange unit which can be detached and attached freely as a sensitization belt unit 101. Furthermore, the electrification machine 506, a cleaning blade 523, and the toner delivery screw 104 are further formed in this sensitization belt unit 101. The toner delivery screw 104 conveys the toner removed by the cleaning blade 523 at the end of this unit, and stores it in a waste toner bottle (illustration abbreviation).

[0019] This printer performs electrophotography processes, such as electrification, exposure, development, an imprint, erasion, and cleaning, with the equipment formed in that perimeter, having the driver and drive motor which get into gear to the gearing which prepared in the end of the driving roller 102 in the

sensitization belt unit 101, and this, and rotating the sensitization belt 117 clockwise in drawing 1 . Furthermore, he prepares carrying handle 501a in the cartridge case 501 of the sensitization belt unit 101, and is trying to detach and attach in the vertical direction along with the guide member 208,209.

[0020] In drawing 3 , the lock member 301 is located in the upper part of the sensitization belt unit 101, and is prepared possible [ \*\*\*\* ] focusing on the supporting point 302 prepared in the body of equipment. This lock member 301 acts so that the bearing 207 of a driving roller 102 may be pressed downward in the condition of having pushed down as chain-line 301' showed and the sensitization belt unit 101 may be locked in the wearing condition, and it is constituted by configuration from which the ramp which performs a guidance operation of a bearing 207,303 becomes effective while it will cancel a lock condition, if it is \*\*\*\*(ed) in the condition of on the other hand having started as a continuous line 301 showed. When the interlocking rod (narrow plate) 131 interlocked with the attitude (operational status/save status) of development counters 116a-116d is in the actuated position shown by chain-line 131' As a configuration in which it becomes impossible that heights 301a of the lock member 301 interferes with the point of this interlocking rod 131', and carries out \*\*\*\* (standing up) When this interlocking rod 131 is not in a shunting location, and it can be made not to perform attachment-and-detachment actuation of the sensitization belt unit 101, unprepared attachment-and-detachment actuation with a possibility of damaging the sensitization belt 117 is made impossible.

[0021] Development counters 116a-116d develop this sensitization belt 117 by equipping the point by the side of the sensitization belt with developing rollers 110a-110d, and contacting, or approaching and rotating on the front face of the sensitization belt 117, respectively. The development counters 116a-116d used with this operation gestalt are the so-called 1-component development counters, give predetermined bias potential and develop the electrostatic latent image on this sensitization belt 117 while making shearing force act on the toner layer adhering to a said developing rollers [ which have predetermined electric resistance / each / 110a-110d ] front face, forming the thin layer of an electrification toner and making this contact or approach the front face of the sensitization belt 117. In addition, these development counters 116a-116d can take various kinds of configurations known from the former, without being restricted to the configuration mentioned above.

[0022] It is held movable to a longitudinal direction in the state of illustration at drawing 1 , each development counter 116a (- 116d) maintaining a position by the interior material of a proposal which does not illustrate the projection 204 of the edge 206 of each developing-roller 110a (- 110d), a bearing 205, and a flank, respectively. The development counter attachment-and-detachment door 111 is carried out as [ open / focusing on the supporting point 112 / \*\*\*\* and ], and enables attachment and detachment (exchange) of each development counters 116a-116d etc. moreover, the cam 104 prepared in cam shafts 108a-108d -- a-104d is supported rotatable and drawing 1 is rotated with an electric drive based on an electrical signal between the location shown as a continuous line, and the location which \*\*\*\*(ed) 180 degrees from there. By this, each development counters 116a-116d move while location (\*\*) in drawing 1 (Ha). A location (Ha) is an actuation (development) location of development counter 116b (116a-116d), and location (\*\*) is a halt (un-developing negatives) location.

[0023] As shown in drawing 2 , each development counter 116a (- 116d) is energized with the spring 202,203 at the antipathy light belt side, what was chosen by rotation of Cams 104a-104d moves forward to an actuated position against the spring force, and that by which energization discharge was carried out retreats in a halt location by the spring force. The control circuit (illustration abbreviation) which controls said clutch to form a gearing 210, to make it gear with the driver connected to a driving source through a clutch in each developing-roller 110a (- 110d), to rotate developing-roller 110 of development counter 116a (- 116d) which is in development location synchronizing with actuation of said camsa [ 104 ]-104d a (110d) to it, and to perform a development operation to it as shown in drawing 2 is prepared. In addition, although drawing 1 and drawing 3 show the attitude of development counter 116b of a Magenta, structure and an operation are the same about other development counters.

[0024] In an each development counters [ 116a-116d ] flank, the actuation plate 121 is arranged along with this flank, and by the support pin 123,125, to it, it holds so that it may be movable to the longitudinal direction of drawing 1 . Moreover, as it prepares possible [ \*\*\*\* ] by the supporting-point pin 127, it connects by said actuation plate 121 and pin 128 and a lever 122 is shown in drawing 1 , it is made to move between the shunting location which shows the actuation plate 121 to drawing 1 as a continuous line 121, and the locations shown by two-dot chain line 121' by operating a lever 122.

[0025] It is made to engage with the height (illustration abbreviation) which formed Projections 126a-126d inside the actuation plate 121, and was prepared in each development counters 116a-116d. In addition,

between these projections 126a-126d and the height prepared in each development counters 116a-116d, it constitutes so that it may not become a failure in case each development counters 116a-116d move to actuation/halt location, and some gap may occur in the state of an each development counters [ 116a-116d ] actuated position (Ha). Furthermore, the interlocking rod 131 formed in the upper part of a development counter stowed position is connected with said actuation plate 121 in the connection section 124 by Kami who supported with the guidance hole 132. Thereby, the interlocking rod 131 is interlocked with migration of the actuation plate 121, and moves the operation location shown by the shunting location shown as a continuous line 131, and two-dot chain line 131' to drawing 1.

[0026] The photo conductor attachment-and-detachment door 133 is formed in the attachment and detachment for exchanging the sensitization belt unit 101 for the equipment outer frame top face of this printer, the triangle-like projection 132 is formed inside this photo conductor attachment-and-detachment door 133, and opening operation is made easy, while opening slightly the photo conductor attachment-and-detachment door 133 wide and specifying the open condition of this photo conductor attachment-and-detachment door 133 to an operator, when the edge of said interlocking rod 131 is located in a shunting location.

[0027] By the above, by operating a lever 122, each development counters 116a-116d are moved to a shunting location (the same is said of location (\*\*)) in Magenta development counter 116b, and others), the interlocking rod 131 also moves to a shunting location at coincidence, and distance sufficient between the sensitization belts 117 is secured. And it makes to carry out attachment-and-detachment actuation of a sensitization helmet and the unit 101, without operating a lever 122 into impossible. Since a pin 128 serves as point of application, the actuation plate 121 always does not maintain parallel and does not necessarily move, but since it is held by the support pin 123 as shown in drawing, good actuation can be obtained, if it has a clearance suitable between the support pins 123 so that it may become a predetermined posture in a shunting location and an operation location.

[0028] Moreover, with this operation gestalt, it is made for the edge of a lever 122 to contact the paries medialis orbitae of the development counter attachment-and-detachment door 111, and by actuation which closes the development counter attachment-and-detachment door 111, as the lever 122 was returned to the operation location, actuation trouble was reduced. Furthermore, with this operation gestalt, the actuation plate 121 which makes development counters 116a-116d shunt was arranged only on one side. Although it is checking that an experimental function and dependability sufficient in a result at one side are acquired, positive actuation can be obtained by preparing this configuration in both sides by development counters [ 116a-116d ] structure, the supporting structure, etc., in being required. In this case, if the member which connects a lever 122 and the corresponding lever of an opposite direction by right and left is prepared, it is distinct that operability improves more.

[0029] Drawing 4 shows the important section in other operation gestalten. The 1st operation gestalt mentioned above and explanation of a common part are omitted. With this operation gestalt, the development counter attachment-and-detachment door 111 and a lever 401 are connected by the connection beam 402 and the pin 403,404, and it is made to operate the member which is interlocked with closing motion of the development counter attachment-and-detachment door 111, and is interlocked with the actuation plate 121 and this actuation plate 121.

[0030] With this operation gestalt, development counters 116a-116d can be made to be able to move like the 1st operation gestalt only by actuation of the development counter attachment-and-detachment door 111, and much more good operability can be realized.

[0031]

[Effect of the Invention] As stated above, while preventing the damage at the time of attachment and detachment of a photo conductor because things are made to be made so that attachment-and-detachment actuation of a photo conductor may be performed only when this invention has a development counter in the shunting location which secures a photo conductor and sufficient distance, the effectiveness that good actuation can be ensured is acquired.

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[Translation done.]

## \* NOTICES \*

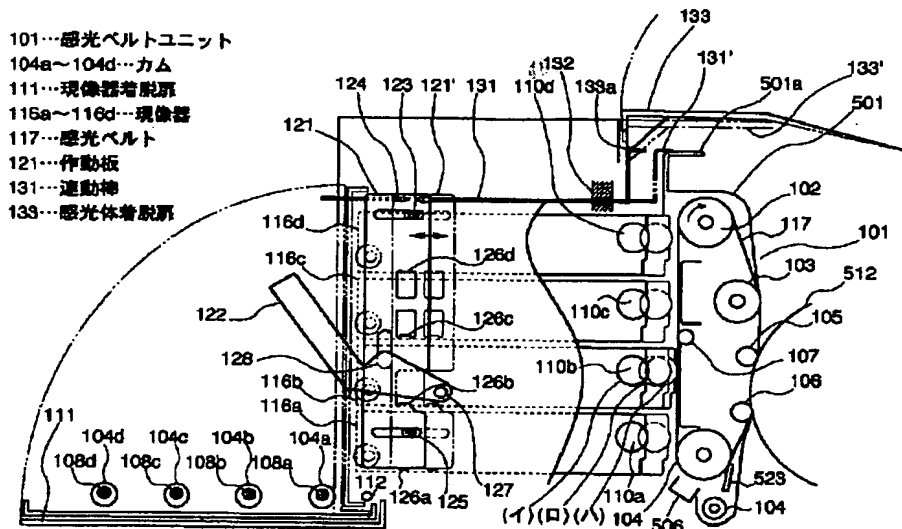
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## DRAWINGS

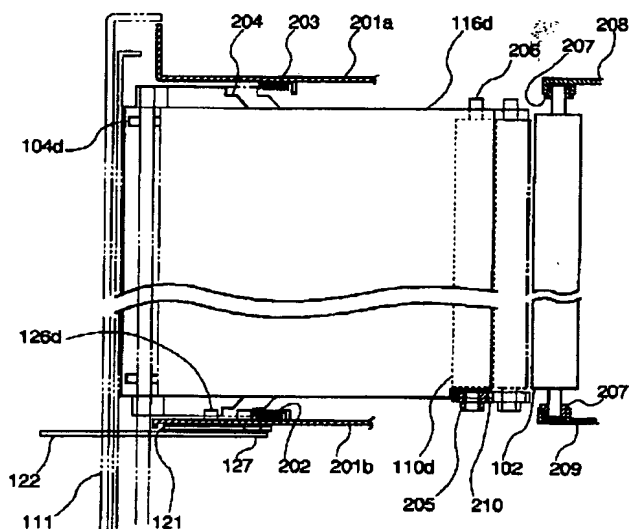
[Drawing 1]

図1



[Drawing 2]

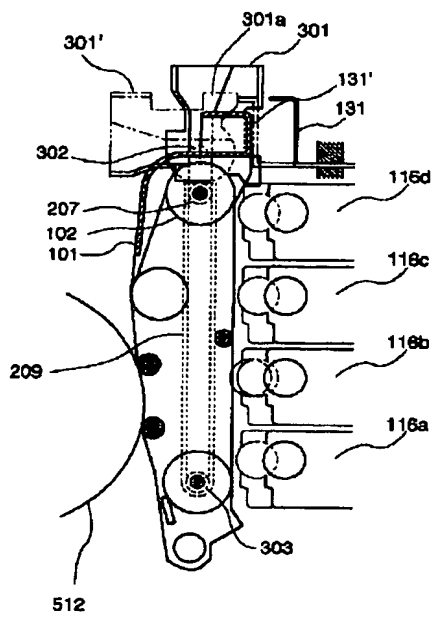
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[Drawing 3]

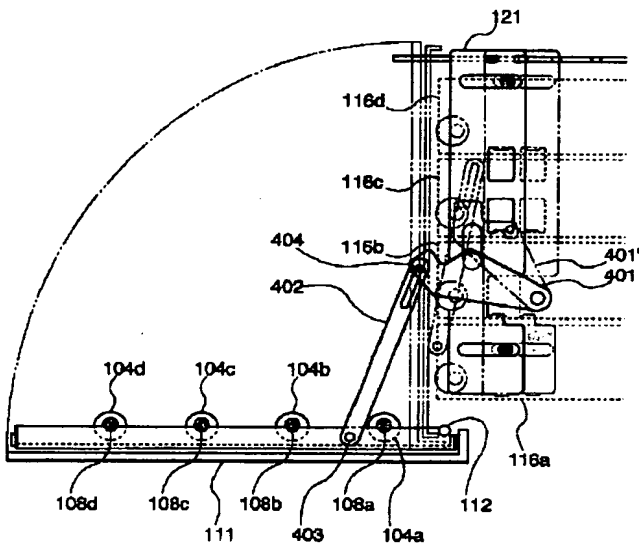


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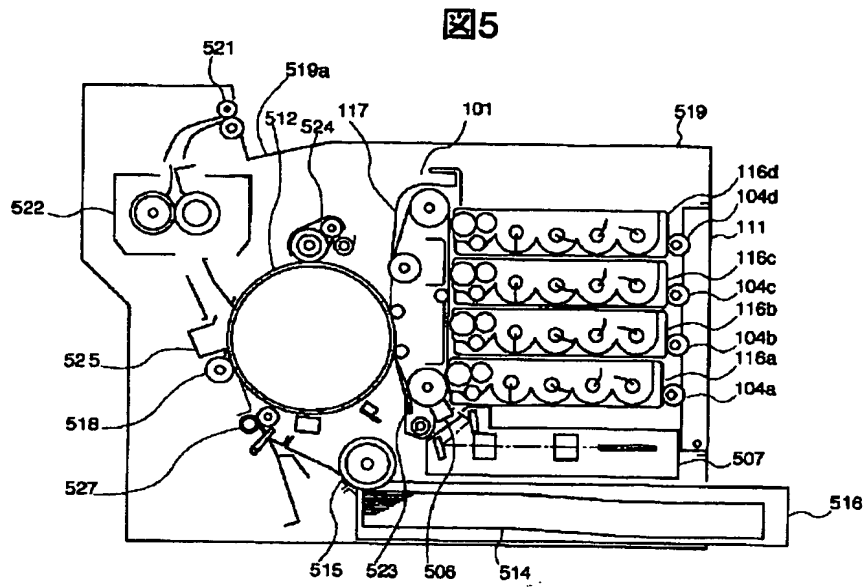


[Drawing 4]

図4



[Drawing 5]



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